Supporting Information 1. Comparison of the individual observed SPR curves shown in Figure 1 (open circles) and the calculated SPR curves (solid lines, via Fresnel equations) based on the fitting parameters in Table 1. The figure labels are associated with those of Figure 1.
Supporting Information 2. SPR curves of the biotinylated SAMs prior to streptavidin functionalization. The mole fraction $\chi$ of Cy5-dCPT indicates the respective experiments where the sensor chips were employed. The discrepancies of the SPR curves are due to the sample-to-sample variation of the metal film.

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Supporting Information 3. SPR curves of DNA hybridization with mole fraction of Cy5-dCPT $\chi = 1.00, 0.90, 0.75, 0.50, 0.25,$ and 0.00. The SPFS curves correspond to the biosensor architectures with complete DNA double strand after the enzymatic synthesis (i.e., SAM/Streptavidin/ds-(P45/T50)). Note: the y-axes of the fluorescence signal are not identical for all SPFS curves.

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Supporting Information 4. Comparison between the observed SPR curves with Cy5-dCPT incorporation (open circles) and the calculated SPR curves based on the fitting parameters in Table 1 (solid lines) at various mole fraction $\chi$ of Cy5-dCPT in mixed dNTPs solution.

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